

MAP UNITS

About 4,200 feet (1,280 m.) of sedimentary rocks of Late Mississippian to Middle Pennsylvanian age crop out in the New River Gorge area. The basal 1,900 feet (579 m.) of the exposed beds represent near shore, swamp, intertidal, and marine deposits that are assigned to the Bluefield and Hinton Formations and to the Princeton Sandstone of Late Mississippian age and to the Bluestone Formation of Late Mississippian and Early Pennsylvanian age. Outcrops of these formations are principally in the southeastern part of the area and, to a limited extent, northward along the lower valley slopes bordering the New River and its tributaries in the central part of the area. The remainder of the exposed stratigraphic section consists mostly of continental coal-bearing rocks of the Pocahontas, New River, and Kanawha Formations of Early to Middle Pennsylvanian age. These rocks cap hilltops in the southern part of the area and, as a result of a northwesterly regional dip, comprise the entire exposed section in the northern part.

Bluefield Formation.--The oldest exposed rocks in the Gorge area are grayish-red, greenish-gray, and gray calcareous shale that occur in the uppermost part of the Bluefield Formation. A maximum of 25 feet (7.6 m.) of the formation is exposed and possibly another 900 feet (274 m.) of similar lithology interbedded with lesser amounts of sandstone, siltstone, and limestone are present in the subsurface.

Hinton Formation.--Outcrops of the Hinton Formation are dominated by grayish-red, partly calcareous shale and siltstone. Also present are several intercalated sandstone beds, minor amounts of medium-gray and greenish-gray shale, fossiliferous limestone and calcareous shale, and a few thin beds of coal or carbonaceous shale underlain by rooted underclay. The Hinton Formation ranges from about 950 to 1,150 feet (290-351 m.) in thickness in the southern part of the Gorge area.

The Stony Gap Sandstone Member at the base of the formation is commonly quartzose, highly resistant, and about 100 feet (30 m.) thick, including as much as 25 feet (7.6 m.) of grayish-red or greenish-gray shale. This member forms prominent cliffs and rapids along New River near Hinton, West Virginia. An abandoned quarry in the Hinton quadrangle appears to have been the source of riprap for road construction.

The Hinton Formation also includes the thickest and most widespread limestone bed in the Gorge area -- the Little Stone Gap Member or Avis Limestone of Reger (1926). It consists of as much as 55 feet (17 m.) of argillaceous limestone and calcareous shale and contains abundant marine fossils including brachiopods, pelecypods, gastropods, and bryozoans.

Bluestone Formation.--The Bluestone Formation includes six widely recognized members that total about 650 feet (198 m.) in thickness. The Pride Shale Member, at the base of the formation ranges from about 40 to 120 feet (12-37 m.) in thickness and consists principally of dark-gray evenly bedded shale that grades locally to silty shale or inter-laminated siltstone and shale. Basal beds of the member may include partly calcareous greenish-gray and grayish-red shale. The overlying dark-gray shale beds commonly contain pyrite and ironstone nodules and lenses. Marine fossils including brachiopods, pelecypods, gastropods, and cephalopods occur locally in the member.

The overlying Gladly Fork Sandstone Member varies from silty ripple-bedded sandstone to coarse conglomeratic sandstone. It commonly consists of light-gray, fine- to coarse-grained, thin-bedded to massive sandstone. Conglomerate is diverse in composition but consists primarily of well-rounded to angular fragments of quartz, shale, siltstone, limestone, chert, and siderite. The member ranges from 5-100 feet (30 m.) or more in thickness.

The gray member of the Bluestone Formation is a wedge of interbedded shale, sandstone, and siltstone with a few thin beds of underclay and coal. It is restricted to the southeastern part of the New River Gorge area, where it attains a maximum thickness of about 200 feet (61 m.).

The red member of the Bluestone Formation is principally grayish-red partly calcareous shale, siltstone, and sandstone. Also present are greenish-gray to medium gray shale, siltstone, sandstone, and a few thin beds of argillaceous limestone, rooted underclay, and carbonaceous shale. The red member is as much as 250 feet (76 m.) thick in the southeastern part of the Gorge area and thins northward to about 20 feet (6.1 m.). The grayish-red beds in this member wedge out northward along the New River in the Thurmond quadrangle.

The Burnwell Member consists predominantly of medium- to medium-dark-gray calcareous shale and siltstone which coarsen upward and, in places, grade to very fine- to fine-grained ripple-bedded sandstone. A basal bed of black carbonaceous shale contains abundant ostracodes and pelecypods; overlying beds of the member contain brachiopods and pelecypods. The member was identified only in the Meadow Creek and Hinton quadrangle where it is as much as 50 feet (15 m.) thick.

The upper member of the Bluestone consists of shale and siltstone that are typically grayish-red and greenish-gray. It intertongues and grades laterally with the lower sandstone member of the Pocahontas Formation and, because of this relationship, the upper member is classified as Pennsylvanian in age. A persistent bed of light greenish-gray, sparsely rooted, nonbedded claystone as much as 5 feet (1.5 m.) thick occurs at the top of the upper member.

Pocahontas Formation.--In contrast to the abundance of variegated, calcareous beds in the Bluestone Formation, the Pocahontas Formation is a coal-bearing sequence consisting of interbedded sandstone, siltstone, shale, and underclay. Of these, sandstone is most abundant and constitutes about 70 percent of the formation; siltstone, shale, and underclay total 28 percent, and coal, the remaining 2 percent. Plant fossils, including stems, leaves, and roots, occur throughout the formation, and fresh- or brackish-water invertebrate fossils are present in a few beds. From a maximum thickness of about 400 feet (122 m.) in the southern part of the Gorge area, the formation thins northward and wedges out in the subsurface in the Gauley Bridge quadrangle. Coal beds in the Pocahontas Formation, including the Pocahontas Nos. 2, 3, and 6 zone, are as much as 6 feet (1.8 m.) thick and relatively continuous in the southern part of the Gorge area but become thinner and more discontinuous northward with the general northward thinning of the formation.

New River Formation.--In the New River Gorge area, the Pocahontas Formation is unconformably overlain by the New River Formation. This unconformity occurs at the base of the Pineville Sandstone Member of the New River Formation in the Gorge area and coincides with the widespread unconformity that separates Mississippian rocks from Pennsylvanian strata north of the area underlain by the Pocahontas Formation.

The New River Formation ranges from 700 feet (213 m.) in thickness along the New River in western Fayette County to about 1,000 feet (305 m.) in thickness in the southeasternmost outcrops. It is a coal-bearing sequence of sandstone, siltstone, shale, and underclay that is lithically similar to the Pocahontas Formation except for the presence of thicker and more widespread quartz-pebble conglomerate and quartzose sandstone. Quartzose conglomeratic sandstone predominates in the northwesternmost outcrops of the formation and forms precipitous cliffs along the New River. These sandstone units, including the Nuttall and Raleigh Sandstone Members, become less conspicuous southward and as a result of lateral gradation in part to non-resistant, micaceous, and feldspathic sandstone with a relatively low quartz content of 50 to 60 percent. The Nuttall Sandstone Member is the uppermost member of the New River Formation, and the contact with the overlying Kanawha Formation of the Middle Pennsylvanian Series is placed at the base of a thin coal bed that overlies the Nuttall Sandstone Member. Commonly, a few feet of underclay, shale, or siltstone occur between the sandstone and the coal. The New River Formation contains the principal and most widely mined coal beds -- including the Fire Creek, Beckley, and Sewell -- in the Gorge area. Plant fossils occur in most beds of the formation and invertebrate fossils such as pelecypods, ostracodes, and brachiopods are present locally.

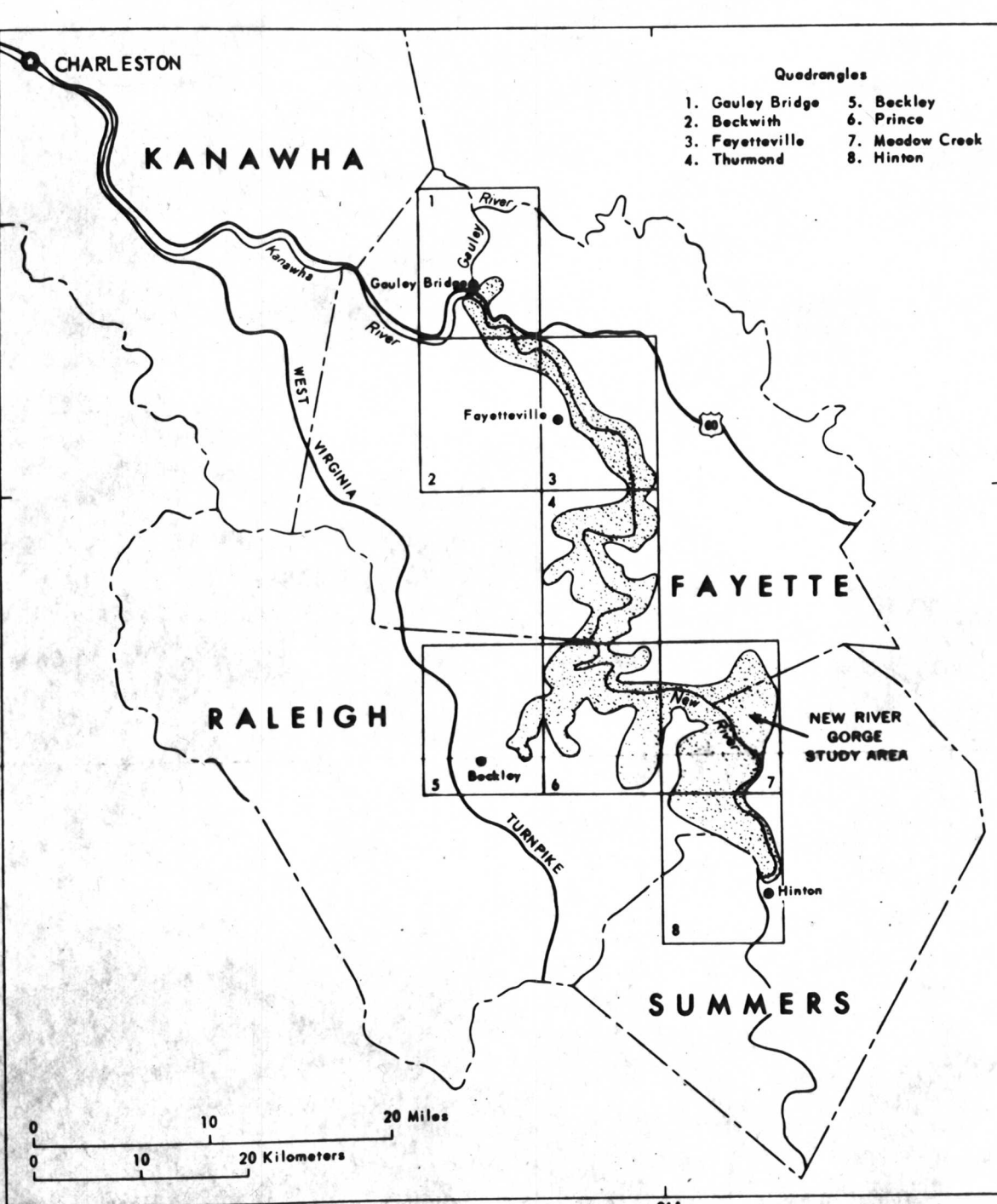
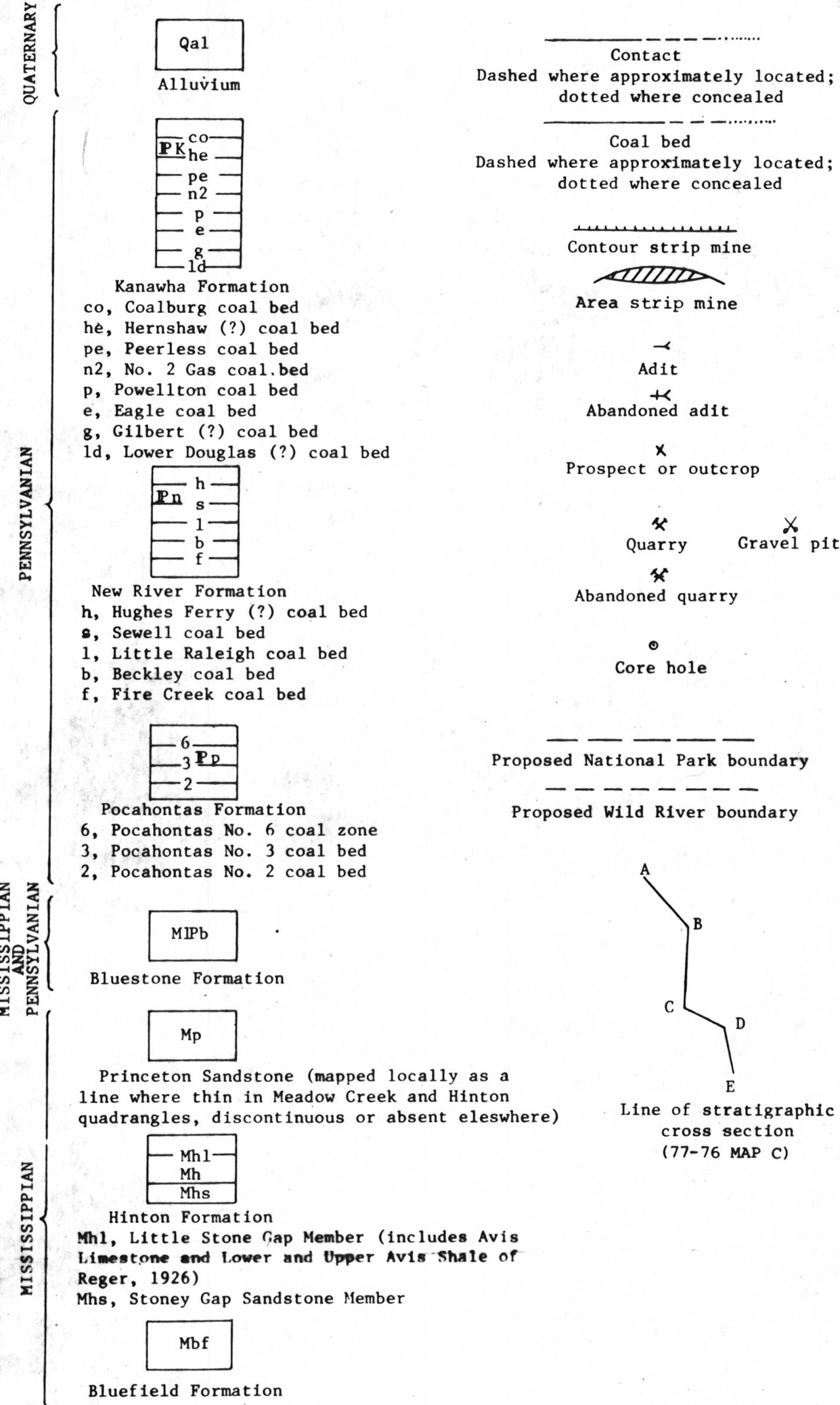
Kanawha Formation.--The Kanawha Formation is confined to the northern part of the Gorge area, where about 900 feet (274 m.) of beds in the lower part of the formation conformably overlie the New River Formation. About 65 percent of the formation consists of relatively non-resistant shale, siltstone, and underclay. Sandstone comprises about 33 percent, and it is less quartzose and less resistant to weathering than the cliff-forming sandstones of the New River Formation. The Kanawha Formation contains many of the highly productive coal beds of West Virginia, and in the Gorge area coal comprises about 2 percent of the formation. The coal is distributed in 12 beds, of which four -- the Eagle, Powellton, No. 2 Gas, and Hershaw (?) -- are thick enough to contain coal resources. Fossil plants, including leaves, roots, and stems, are common in many beds and fresh-water invertebrate fossils occur in the roof shale of the Gilbert (?) coal bed.

Surficial Deposits.--The bedrock in the Gorge area is covered locally by surficial deposits, including alluvium in the flood plains of the major rivers and tributaries and colluvium in sporadic accumulations on the lower valley slopes. Of these, only the larger alluvial deposits are mapped, and these consist of unconsolidated boulders and gravel that commonly grade upward to poorly sorted sand and silt. Alluvium is a source of gravel at one locality along the New River in the Prince quadrangle.

REFERENCE

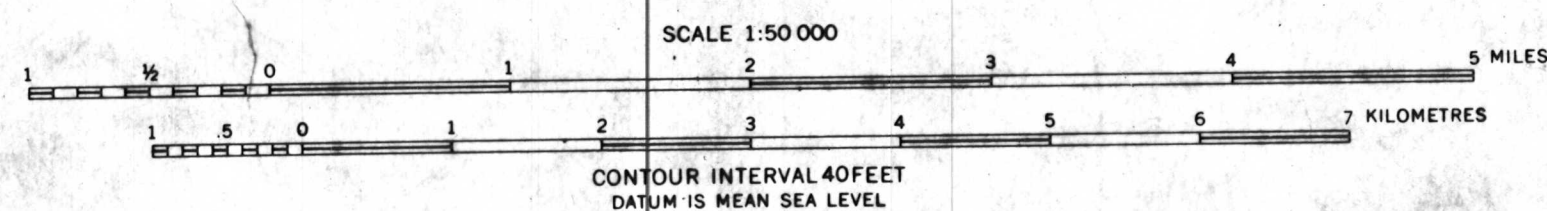
Reger, D. B., 1926, Mercer, Monroe, and Summers Counties: West Virginia Geol. Survey, 963 p.

EXPLANATION



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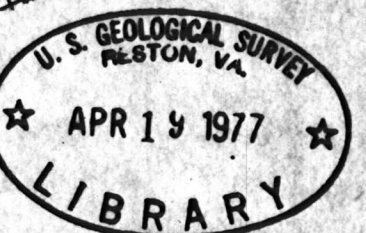
This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards or nomenclature.



GEOLOGIC MAP OF THE NEW RIVER GORGE AREA, FAYETTE, RALEIGH, AND SUMMERS COUNTIES, WEST VIRGINIA

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West Virginia (New River Gorge area) Revisions: V. 5, 1977
Sheet A
Map 1



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